N. C. AGRICULTURAL EXTENSION SERVICE

OF THE

STATE COLLEGE AND

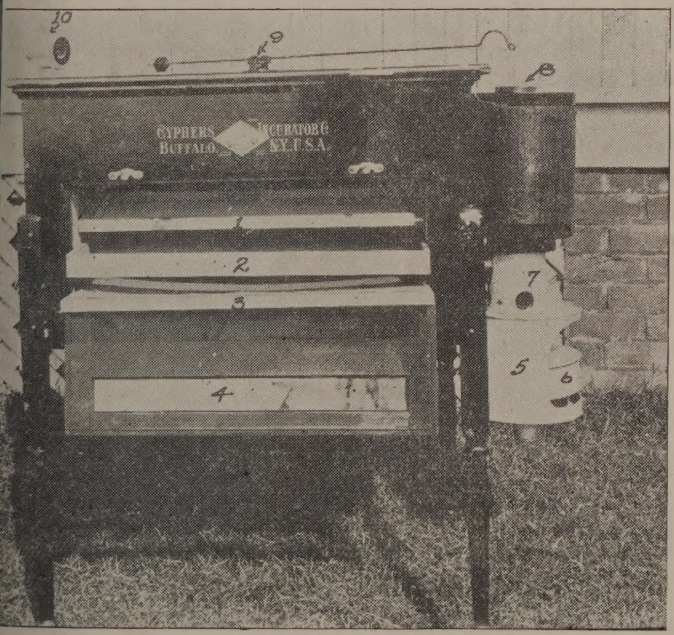
STATE DEPARTMENT OF AGRICULTURE AND

U. S. DEPARTMENT OF AGRICULTURE COOPERATING

B. W. KILGORE, DIRECTOR

RALEIGH

NATURAL AND ARTIFICIAL INCUBATION



Air Incubator. 1, Cheese cloth tray forming floor of upper chamber, dropped 2. Egg tray of middle chamber. 3, Nursery tray forming floor of lower chamber. to incubator. 5, Lamp holder. 6, Lamp. 7, Flue. 8, Wafer disk over top of 9, Set screw used in adjusting damper bar. 10, Cheap egg candler which fits p lighting flue.

BUTED IN FURTHERANCE OF THE ACTS OF CONGRESS OF MAY 8 AND JUNE 30, 1914.

JOINT COMMITTEE FOR AGRICULTURAL WORK

Gov. Cameron Morrison	Ra
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W. A. Graham	Ra
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Clarence Poe	Ra
A. T. McCallum	Red Sp
C. C. Wright	Hunting C
O. L. Clark	Cla
T. T. Thorne	Rocky M
C. W. Gold	Green
J. F. Diggs	Rocking

NATURAL AND ARTIFICIAL INCUBATION

F. KAUPP, *Poultry Investigator and Pathologist, Animal Industry Division.*

Selecting Eggs For Hatching

lecting eggs for hatching only well-formed eggs should be
Do not select eggs that have ridges around them, that are too
that have thin shell, that have small end enlarged, that are
nd round, that are abnormally long, or those on which the
not deposited regularly, as such eggs do not hatch well.
ng eggs should weigh at least two ounces.
s for hatching should be kept in a cool place and covered from
t and dust. Set them as soon as possible, and never set eggs
e over twenty-one days old.
rds show that a fair hatch to expect from one sitting of
eggs when they are set on the premises where laid, is ten
and if handled or shipped, eight chicks. If set in an incuba-
ie hatch is still less. One should obtain from 50 to 60 per
hicks from eggs put in the machine, but much depends upon
erator, a good operator getting a much better hatch than one
andles the machine badly. All the low hatches cannot be blamed
hen.
ling eggs over rough roads without protection from the hard
g will injure them and cause a poor hatch; likewise, careless
ng by express or postal employees.
shipping eggs for hatching, parcel post containers should be
Wrap each egg with soft paper before placing it in its cell,
ll with strong cord, and label "eggs for hatching" on all sides
box, preferably with red ink.

Time Required For Hatching

number of days necessary for hatching eggs of various kinds
s follows: Fowls, 21 days; geese, 30 days; turkeys, 28 days;
, 28 days; guineas, 28 days; pigeons, 17 days.

Some Reasons Why Chicks Die In The Shell

gs from birds of low vitality, such as old and impotent hens, and
too fat by lack of exercise, do not produce good hatching eggs.
ature birds should not be selected for breeding, and too many
les should not be mated with one male. Nutritious feed should
pplied and the birds should be kept in sanitary, properly venti-
quarters. The birds should be kept free from vermin such as lice
mites, which sap their vitality. Eggs must not be kept too long
e incubation or at too high a temperature.
oper methods of incubation must be used. In the heavy breeds
r twelve females may be mated to one male, and in the lighter
ls fifteen to twenty. Less numbers should be kept with older

males. The hens' feed must be properly balanced (see cir
No. 126 on culling and feeding). The breeders must be in
vigorous condition in order that the progency may be strong
vigorous. Breeding stock should not be expected to lay too he
during the preceding winter. They should have exercise, must
become frightened, and sanitary surroundings should be prov
Tests show that when the hen is fed scantily the fertility of the
is low.

Eggs in incubation require plenty of air, as a lack of p
exchange of air in the machine means a low hatch. The temper
must be kept at 103 degrees F. as an uneven temperature mea
low hatch and weak chicks. Eggs from the third to the eight
day must be turned at least once a day and six times a day will
a better hatch, and fewer cripples, as a hen turns her eggs nine
a day. Eggs in incubation must lie on the sides and not on the

How To Set A Hen

For the farm the combination sitting and brooding coop wi
found very useful. (See circular No. 6 for construction of the
bination sitting and brooding coop.) The best type of hen to
one of medium weight, such as the Rocks, Reds, Wyandott
Orpingtons. The light breeds are not so large or well featherec
make poor sitters.

The first sign that a hen wants to sit is that she remains o
nest longer when laying, later she does not leave the nest on
approached and will ruffle her feathers, cluck and even pick a
intruder. For early hatching a hen with much body fluff is de
Set six hens at one time. A box for the sitting hen should be si
inches square with a board five inches wide at the lower porti
the front to give support to the nest. Make the nest of excelsi
soft straw, such as oat or wheat straw. Work the straw down
fully so as to make it well rounded out, with no low corners fo
eggs to roll into and become chilled. Leave no sharp straws sti
up to prick the hen.

Prepare the box in a darkened room away from the other
and from rats, or use the combination sitting and brooding
Keep feed and water before the sitting hen at all times if s
set in an individual coop, or let off once a day if several are s
one room. If an egg becomes broken, secure a pan of warm
and dip the eggs that are smeared, removing the portion of
with as little rubbing as possible. If eggs become smeared an
not properly washed, the pores will become closed and the eggs
not hatch well. Soiled straw should be removed and replaced
clean straw. The essential principles in incubation are heat, mois
and oxygen. Hens should be set on the ground to insure p
moisture.

Candling The Eggs

Candle eggs on the seventh day and remove all infertile
Place the balance under five hens, and the sixth may be given an
sitting. A homemade candler may be made by using a small

shoe box. Cut a hole in one end for air and a hole on one side e lamp flue. Hold the egg up to the side hole and if it is the chick can be seen. If the egg is infertile it will appear The candling should be done preferably at night.

Caring For The Chicks

he sitting hen is quiet during hatching, leave the chicks under s the heat from the mother's body is of proper temperature. several hens are set at the same time, the chicks may be re- as fast as hatched and kept in a woolen lined box covered aper till the hatch is over. Then at night give each hen fifteen nty, depending on the number she can hover well. One hen n this way be dispensed with or returned to the flock of layers. protect the chicks from hawks and rats, make a wire netting feet by 12 feet, and 18 inches high, and allow the chicks to n this enclosure during the day. At night a frame covered ne-half inch mesh sand screen placed tightly against the front coop will keep the rats out from the front.

hen usually weans her young when they are from six to weeks old. They should then be placed in a range house and not with the adult birds until fall. (For range houses see circular).

Hatching Eggs With The Incubator

e eggs should be set for every pullet wanted. If it is the desire ve 500 pullets, 2500 eggs must be set. Fifty per cent hatch give 1250 chicks and twenty per cent deaths will leave 1000 s, of which about fifty per cent will be cockerels, which may ld as broilers when ten weeks old, thus leaving five hundred ts.

tching may be done by a small oil, gas, or electric incubator, a mammoth coal, gas, or electric incubator. The cost of operat- 100-egg incubator twenty-one days, using kerosene at 12 cents allon, will be about 25 cents. It costs ten to fifteen cents to feed ing hen.

Explanation Of The Incubator

incubator consists of three essential parts, namely: An in- ed and ventilated box—the body—a heater, and a regulating e. The body of the machine is supported by legs. The heating e is attached to the side of the body, except in those operated ectricity or by a stove. The body is provided with three cham- namely: An upper, middle, and a lower chamber.

he upper chamber is the heating chamber, and is separated from egg chamber by a cloth diaphragm in those heated by hot air. e machine has a cloth diaphragm it must be brushed after each n to prevent clogging the pores with dust. In single tray in- tors the tray should be turned end for end each day. In two incubators, the trays should be turned end for end and trays anged each day. In hot water systems the chamber is occupied pipes. These pipes are not separated from the egg chamber. eggs occupy the middle chamber. The lower chamber, when

present, is provided with canvas covered trays and is called nursery chamber and the trays, the nursery trays. Where a mov piece is provided to the front part of the egg tray, this mus removed on the eighteenth day so that as the chicks hatch the causes them to come forward and fall down into the nursery tray

Starting And Regulating The Incubator

The regulating device is so arranged that a fairly even temper can be maintained, but the incubator should be placed in a in which the temperature does not vary more than twenty de in twenty-four hours. A dry cellar with floor air drainage is pref or a "spare" bed room on the north side of the house. Drafts not be allowed on the incubator. The incubator has a ventilat the bottom for the escape of carbon dioxide and this must be open at all times.

For oil burning incubators, use only a good grade of oil. properly, trim wick, and fill with oil once a day. It is best to s off the charred portion of the wick with a dull knife. The bu must be thoroughly cleaned by boiling after each hatch. Turn before handling lamp. Oil on ones hands will ruin the hatch if are handled afterward, as the oil closes the pores in the shell.

In starting an incubator, first level it with a spirit level. L the thumb screw on the top of the incubator till the tin disc the top of the heater flue. Then start the lamp. Have all ventil of the incubator open and do not put the eggs in the machine it can be held at a temperature of 103 degrees F. for at least tw four hours.

Leave the chicks in the incubator till the third day after the chick is hatched. (See circular No. 126 on feeding.)

Brooding Chicks Artificially

The brooder should be kept at a temperature of 100 degre at all times. Chilling of chicks causes diarrhea, due to the cata condition of the bowels which develops.

In small lots of 50 to 100 the chicks may be brooded in oil bu hovers or electric brooders. In lots of 500 the coal or oil bu deflector hover is best. Chicks must have exercise, so the grain is thrown in fine litter in their run. The litter under the must be changed each day, and all the litter of the run mu changed once a week. On warm days the chicks should be all to run out but should be returned before the evening air bec cool enough to chill them. In large numbers care must be take to allow them to pile and thus be killed. Fresh, clean water mu kept before the chicks at all times, remembering that spoiled and foul water containers makes sick chicks, diarrhea, and death. feeding must be regular, and the proper kinds of feed suppli all times.